

6.NS Reasoning about Multiplication and Division and Place Value, Part 1

Alignments to Content Standards: 6.NS.B.3

Task

Use the fact that $13 \times 17 = 221$ to find the following.

- a. 13×1.7
- b. 130×17
- c. 13×1700
- d. 1.3×1.7
- e. $2210 \div 13$
- f. $22100 \div 17$
- g. $221 \div 1.3$

IM Commentary

The three tasks in this set are not examples of tasks asking students to compute using the standard algorithms for multiplication and division because most people know what those kinds of problems look like. Instead, these tasks show what kinds of

reasoning and estimation strategies students need to develop in order to support their algorithmic computations.

[Edit this solution](#)

Solution

All these solutions use the associative and commutative properties of multiplication (explicitly or implicitly).

a. $13 \times 1.7 = 13 \times (17 \times 0.1) = (13 \times 17) \times 0.1$, so the product is one-tenth the product of 13 and 17. In other words,

$$13 \times 1.7 = 22.1$$

b. Since one of the factors is ten times one of the factors in 13×17 , the product will be ten times as large as well:

$$130 \times 17 = 2210$$

c. $13 \times 1700 = 13 \times (17 \times 100) = (13 \times 17) \times 100$, so

$$13 \times 1700 = 22100$$

d. Since each of the factors is one tenth the corresponding factor in 13×17 , the product will be one one-hundredth as large:

$$1.3 \times 1.7 = 2.21$$

e. $2210 \div 13 = ?$ is equivalent to $13 \times ? = 2210$. Since the product is ten times as big and one of the factors is the same, the other factor must be ten times as big. So

$$2210 \div 13 = 170$$

f. As in the previous problem, the product is 100 times as big, and since one factor is the same, the other factor must be 100 times as big:

$$22100 \div 17 = 1300$$

g. $221 \div 1.3 = ?$ is equivalent to $1.3 \times ? = 221$. Since the product is the same size and one of the factors is one-tenth the size, the other factor must be ten times as big. So

$$221 \div 1.3 = 170$$



6.NS Reasoning about Multiplication and Division and Place Value, Part 1
Typeset May 4, 2016 at 18:52:40. Licensed by Illustrative Mathematics under a
Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License .